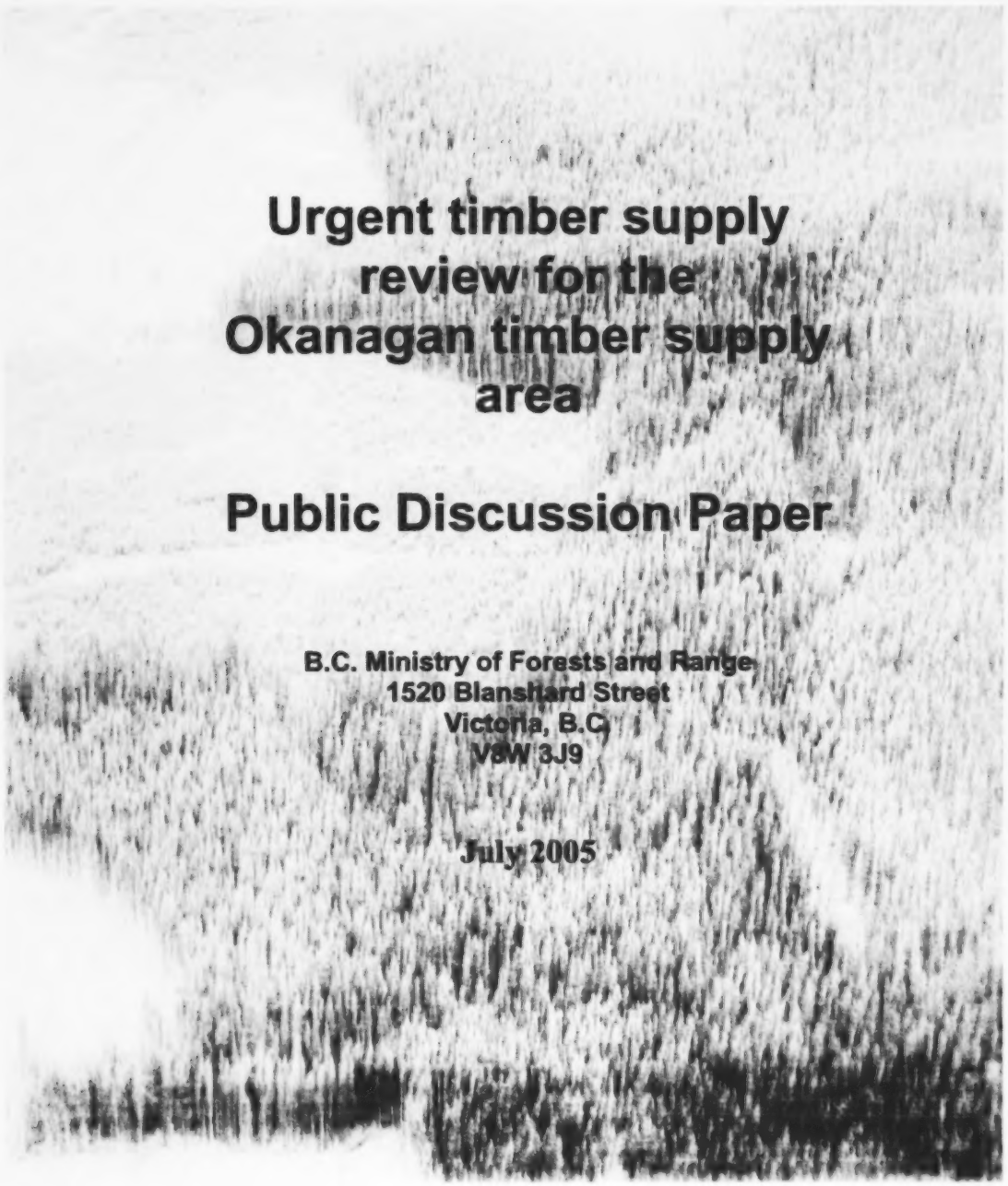
FOREST ANALYSIS BRANCH



Urgent timber supply review for the Okanagan timber supply area

Public Discussion Paper

B.C. Ministry of Forests and Range
1520 Blanshard Street
Victoria, B.C.
V8W 3J9

July 2005

106-06296/

Public Discussion Paper

Introduction

The British Columbia Ministry of Forests and Range regularly reviews the timber supply* for all timber supply areas* (TSAs) and tree farm licences* (TFLs) in the province. This review, the third for the Okanagan TSA, examines the impacts of current forest management practices on the timber supply, economy, environment and social conditions of the local area and the province. Based on this review, if necessary, the chief forester will determine a new allowable annual cut (AAC) for the Okanagan TSA.

By law, the chief forester must review and set new AACs for all 37 TSAs and 34 TFLs every five years. The chief forester can postpone a timber supply review for up to five more years if the annual cut level is not expected to change significantly.

The chief forester may also set a new harvest level earlier than five years to deal with abnormal situations such as damage from severe wildfires or catastrophic insect infestations.

The objectives of the timber supply review are to:

- **Examine** relevant forest management practices, public input, and economic, environmental and social factors;
- **Set a new AAC** for the next five years; and
- **Identify** information to be improved for future timber supply reviews.

Urgent timber supply review in the Okanagan TSA

Mountain pine beetle epidemics are natural events, however, the current infestation has reached an unrecorded level in B.C.'s history. Provincial annual aerial survey data shows the beetle had affected about seven million hectares in 2004. Of the total area affected, 63% sustained light or trace mortality, 26% moderate mortality and 11% severe mortality.

While the forests of the Okanagan TSA have more species diversity then many TSAs in the central interior, pine still represents 57 million cubic metres or 29% of the total volume within the timber harvesting land base. The majority of this pine volume, about 55 million cubic metres, is mature or over mature (> 60 years) and susceptible to the emerging beetle epidemic within the TSA.

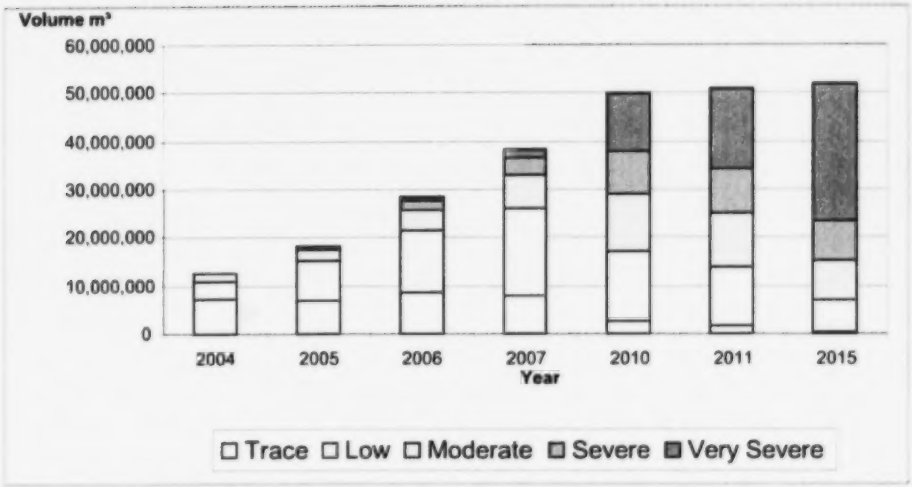
In 2003, the aerial survey indicated 10,500 hectares of infestation in the Okanagan TSA as a result of the 2002 mountain pine beetle flight. The 2004 aerial survey data indicates an unprecedented increase in beetle populations despite existing management strategies to combat the beetle with close to 44,000 hectares affected after the 2003 mountain pine beetle flight. The expansion from the 2004 mountain pine beetle flight is just becoming evident as last fall's attacked trees turn red this spring and summer. Early indications are that the 2004 beetle flight is again showing significant increases in beetle populations and associated tree mortality.

If beetle populations continue to expand as predicted in recent modeling work conduced by the Ministry of Forests and Range, there could be as much as 50 million cubic metres of volume in stands under attack by 2010 (see Figure 1) of which 21 million cubic metres will be dead. While the total volume in stands under attack does not increase significantly by 2015, mortality increases to 37 million cubic metres.

**Throughout this document, an asterisk after a word or phrase indicates that it is defined in a box at the foot of the page.*

Timber supply
The amount of timber that is forecast to be available for harvesting over a specified time period, under a particular management regime.
Timber Supply Area (TSA)
An integrated resource management unit established in accordance with Section 7 of the Forest Act.

Tree Farm Licence (TFL)
Provides rights to harvest timber and outlines responsibilities for forest management in a particular area.



% of the stand attacked and killed by mountain pine beetle:
Trace: 0-1%; Low: 1-10%; Moderate: 11-30%; Severe: 31-50; Very Severe: 51+

Figure 1. Projected total stand volume in various stages of beetle attack by year.

The mountain pine beetle is at an early stage of rapid expansion so intervention may mitigate the economic and environmental impacts. For this reason, the chief forester is considering an urgent review of the timber supply and allowable annual cut in the TSA.

The objectives of this document are to provide British Columbians with an overview of the Timber Supply Review process and harvest level forecasts for the Okanagan TSA, and to encourage them to provide comments. Public comments will be accepted for 60 days, until September 6, 2005.

Before setting a new AAC, the chief forester will review all relevant reports and public input. The chief forester will outline his determination in a rationale statement that will be publicly available upon release. Following the release of the AAC determination by the chief forester, the Minister of Forests and Range will apportion the AAC to the various licences and programs.

Description of the Okanagan timber supply area

The Okanagan TSA is located in south-central B.C. and covers approximately 2.25 million hectares of the Southern Interior Forest Region. It is administered by the Okanagan Shuswap Forest District.

The Okanagan TSA is about 320 kilometres long and 140 kilometres wide, and stretches from the Seymour River/Shuswap Lake in the north to the Canada/U.S. border in the south, and from the Monashee Mountains in the east to the Okanagan Mountains in the west. The interaction of climate and terrain produces a wide range of vegetation, from wet interior hemlock and cedar forests in the north to semi-arid sagebrush grasslands in the south.

The largest population centres in the Okanagan TSA are Kelowna, Vernon, Penticton and Salmon Arm with over 55% of the area's residents. It is one of the fastest-growing areas of the province with a 2004 population of approximately 347,985 which is a total growth of 14% since 1996.

Land-use planning

The Okanagan/Shuswap Land and Resource Management Plan was completed in September 2000, and approved by government in January 2001. It provides direction for the management of Crown land and resources in an area that covers about 2.5 million hectares, including the Okanagan TSA and Tree Farm Licences 15, 33 and 49.

Based on recommendations of the LRMP, nine new provincial parks have been created and two others expanded. Also 19 new protected areas have been created and two were expanded. These new areas comprise approximately 109,000 hectares and are in addition to the 45,525 hectares of protected areas that existed prior to the LRMP. This represents an increase to the protected land base from 2.9% to 7.9% of the productive forest within the TSA.

The plan also recognized the significance of riparian management, allocating 10,000 hectares of the timber harvesting land base for enhanced riparian reserves.

The plan established about 9,500 hectares of caribou reserves in the timber harvesting land base, with harvesting deferred on another 10,000 hectares while research is undertaken that will help define mountain caribou habitat management requirements.

It also provides specific direction for managing biodiversity and guidance for the designation of old-growth management areas.

Only land-use planning decisions regarding forest practices that have received final approval from government are reflected in this timber supply review.

The natural resources

The forests of the Okanagan TSA provide a wide range of forest land resources, including timber, forage, water, fisheries, wildlife, scenic landscapes and recreation opportunities.

The diverse forests and landscapes of the Okanagan TSA are home to a wide variety of wildlife species. The TSA also contains a number of ecosystems that are either unique to this area or have very limited distribution provincially.

About 1.4 million hectares within the TSA are considered productive forest land and 73% of this is available for timber harvesting. The timber harvesting land base represents 46% of the total area within the TSA boundary.

Currently, 66 species occurring in the Okanagan TSA are considered as either endangered, threatened or vulnerable (red- or blue-listed) of which B.C.'s forest practices legislation identifies 20 species at risk that require special management. Approximately 30 of the red- or blue-listed species are associated with forested ecosystems or forest attributes such as coarse woody debris and include such species as bull trout, rubber boa, mountain caribou, northern goshawk, grizzly bear, fisher and mountain goat.

Residents and tourists enjoy outdoor recreation activities such as nordic and alpine skiing, snowmobiling, mountain biking, hiking, camping, fishing and hunting.

There are 51 community watersheds encompassing almost 20% of the timber harvesting land base designated within the TSA. Forest planning in these watersheds is done in consideration of water quantity and quality issues. These lakes and parks in these watersheds and throughout the remainder of the TSA are frequently visited by recreationists.

Figure 2. Map of the Okanagan Timber Supply Area.

Current annual cut

In August 2001, the chief forester established an AAC in the Okanagan TSA of 2,655,000 cubic metres. This included a partition of 80,000 cubic metres to accommodate the harvest associated with the small scale salvage program within the AAC.

In May of 2003 the Okanagan Innovative Forestry Society (OIFS) requested that the regional executive director of the Southern Interior Forest Region consider an increase of 345,000 cubic metres to reflect innovative practices and activities under an Innovative Forest Practices Agreement the government has with the OIFS. The decision on whether to grant the increase in harvest to the OIFS has not yet been finalized.

Base case timber supply forecast

The OIFS prepared a timber supply analysis in 2002 to support its application for a harvest uplift request from the regional executive director. This analysis incorporated a large amount of new data collected subsequent to TSR 2 by the OIFS under its Innovative Forest Practices Agreement. New information included the implementation of inventory adjustments (Vegetation Resource Inventory (VRI) Phase 2 ground sampling), revised site productivity estimates, refined modelling of wet and dry belt stand types and genetic gain assumptions for managed stands.

Due to the urgency the mountain pine beetle epidemic has placed on the TSR 3 review for the Okanagan TSA, it was decided to use the analysis prepared by the OIFS as the basis for the TSR 3 AAC decision with additional analysis work to reflect the ministry's current understanding of the mountain pine beetle epidemic in the Okanagan TSA. A timber supply computer model was used to project a number of possible timber supply forecasts for the next 250 years for the Okanagan TSA and ministry staff chose one timber supply forecast that they believe reflects both the best information sources and current forest management assumptions. This timber supply forecast is called the 'base case forecast'.

The base case is not an AAC recommendation, but rather one of many sources of information the chief forester will consider when setting the AAC. The base case forecast is presented in this report for discussion and comparison; due to areas of uncertainty, the AAC determined by the chief forester may be greater or less than the initial level forecast in the base case.

As Figure 3 shows, the base case timber supply forecast for the Okanagan TSA indicates that the initial harvest level of 3,000,000 cubic metres can be maintained for 40 years. After that, harvest levels decline by approximately 10% and than 6% in the following two 10-year periods before reaching the mid-term harvest level of 2.55 million cubic metres per year. The long-term harvest level of approximately 2.9 million cubic metres per year is achieved 100 years into the harvest forecast.

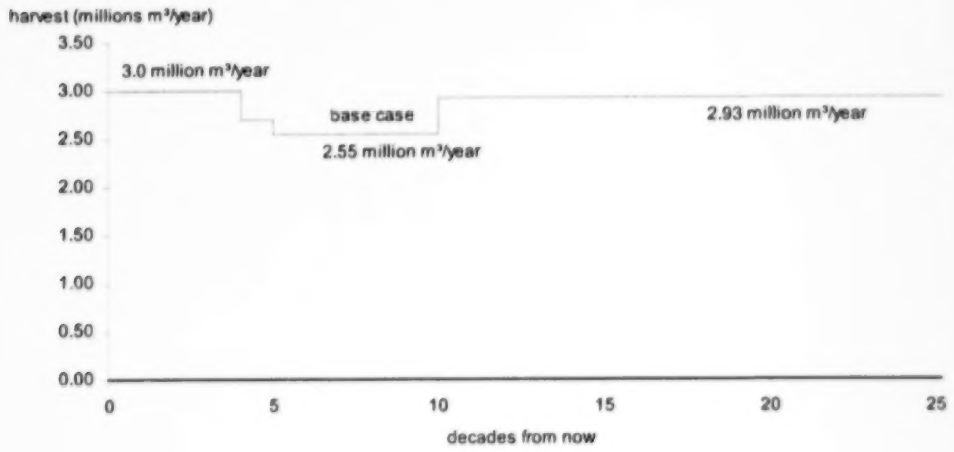


Figure 3. Base case timber supply forecast for the Okanagan TSA, 2005.

Sensitivity analyses: examining uncertainty

Because forests are complex, and there are uncertainties in the data and management assumptions employed in any timber supply analysis, timber supply analysts assess how the base case timber supply forecast might be affected by uncertainties in the inventory information and management practices. These uncertainties are generally examined through what are called sensitivity analyses, which the chief forester will consider in determining an AAC. The sensitivity analyses assess how sensitive the base case timber supply forecast is to changes in information or management practice by making a change to a single information or management assumption in the timber supply model and examining its impact on timber supply relative to the base case.

In the Okanagan TSA, a large number of sensitivity analyses were conducted in the OIFS timber supply analysis to examine the stability of the base case timber supply to uncertainties. Two key sensitivity analyses are presented as they show sensitivity relative to the base case and there is uncertainty in the information used in the base case analysis.

The first of these sensitivities shows the impact of reducing the volume in existing unmanaged stands by 10% (Figure 4) and is of interest as there is uncertainty in the base case inventory adjustment procedure associated with the VRI phase 2 sampling. The VRI phase 2 sampling suggested the existing inventory is underestimated by 7% and the inventory volumes were increased 7% in the base case as a result. While it is very unlikely that existing inventory volume estimates do not require some upward adjustments, initial base case harvest levels are sensitive to reductions in existing stand volumes. Reducing existing stand volumes by 10% (more then the 7% upward adjustment in the base case) results in an immediate reduction in harvest of 8.3% relative to the base case and this reduction in harvest continues at 8 to 12% below that of the base case for 100 years. The long-term harvest level is similar to that of the base case as long-term harvest is reliant on managed rather then existing stand volumes.

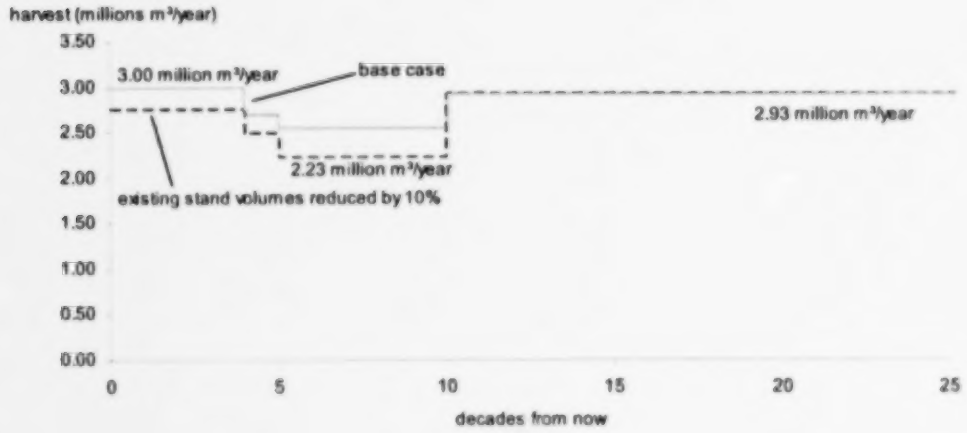


Figure 4. Existing stand volumes reduced by 10% — Okanagan TSA, 2005.

The second sensitivity analysis shows the impact of reducing managed stand site index (productivity estimates) by one metre for all managed stands (Figure 5) and is presented here as there is uncertainty whether revised site productivity estimates used in the base case will be realized operationally in all managed stands. The impact of reducing managed stand site productivity estimates by one metre for all stands results in no impact in the short term as short-term harvest is not reliant on managed stands. Reducing managed stand productivity estimates one metre does however start impacting harvest in the mid-term as managed stands begin being harvested and reduces the long-term harvest level by 14% as harvest almost exclusively comes from managed stands in the long term.

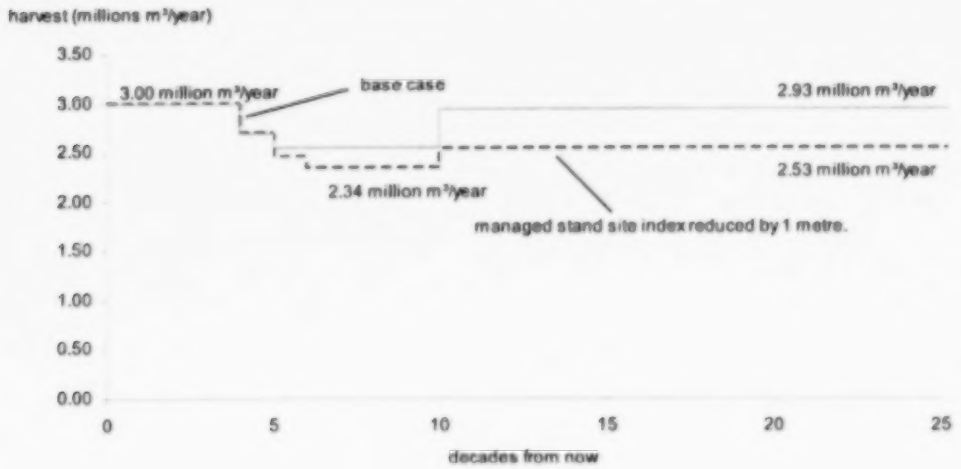


Figure 5. Managed stand productivity estimates reduced by one metre — Okanagan TSA, 2005.

Regional economy

Overall, the communities in the Okanagan TSA are economically well diversified, relying on the public sector, tourism, agriculture, forestry, manufacturing and the retirement industry. The three largest cities have all developed as regional commercial and administrative centres.

The forestry sector supports about 9% of total employment in the area, including jobs through companies and employees purchasing goods and services from local businesses. Each 100 full-time direct forestry jobs in the Okanagan TSA is estimated to support another 52 to 123 jobs, depending on the forestry activity (harvesting or timber processing). In comparison, 100 direct jobs in the public sector support an estimated 45 indirect and induced jobs, and 100 tourism jobs support an additional 25 positions.

Mountain pine beetle considerations

Mountain pine beetles are the most damaging insect that attack lodgepole pine in Western Canada. The insect is a bark beetle, a small cyclindrical insect that attacks and kills trees by boring through the bark and mining the phloem — the layer between the bark and wood of a tree. The beetles also carry a fungus that causes a blue stain in wood from beetle-killed trees.

It is estimated that the total volume of timber on the timber harvesting land base of the Okanagan TSA is approximately 197 million cubic metres. Of this, about 57 million cubic metres are lodgepole pine. Forest health surveys indicate that about 2.7 million cubic metres of pine have been killed by the mountain pine beetle. If one assumes that the beetle infestation in this TSA stops today and the beetle-killed wood is useable for sawlogs for five years, then there will be no need to increase the AAC. Harvesting at the current level will be sufficient to recover the volume in affected stands in less than five years.

However, an immediate halt to the beetle infestation is not likely. Scientists expect that the beetle population will be halted if a) there is a sufficiently long period of cold weather (-25 degrees C in the early fall or late spring, or sustained winter temperatures of less than -40 degrees C) or b) the population collapses due to a shortage of mature pine. Since the recent trend of warm winters in B.C. is expected to continue and there are about 57 million cubic metres of uninfested pine in the Okanagan TSA, it is projected that additional pine trees will be killed.

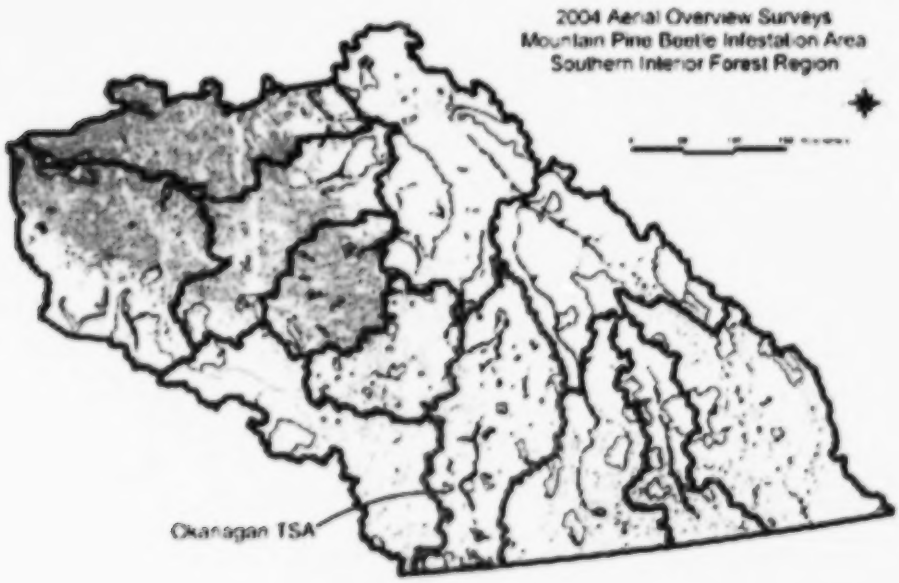


Figure 6. Mountain pine beetle infestation map — Okanagan TSA, 2005.

Proposed objectives and strategy to deal with the beetle infestation

The Okanagan Shuswap district's strategy to deal with the mountain pine beetle epidemic is based on taking all reasonable actions to reduce bark beetle incidence to the level where all new infestations can be addressed following discovery. This would reduce the negative impacts of bark beetle epidemics, and associated harvesting, on biodiversity and other forest values.

In an effort to slow the mountain pine beetle population expansion, areas of recent attack will be harvested quickly and aggressively. Through aggressive removal of beetle brood it is hoped that mature lodgepole pine mortality will be slowed and the window to harvest susceptible stands will be extended. While susceptible lodgepole pine stands will likely become infested regardless of management efforts, slowing the outbreak will allow for improved planning and more orderly harvesting of mature lodgepole pine stands while reducing the threat to immature lodgepole pine stands.

Mountain pine beetle infestation levels in the northwestern quarter of the Okanagan TSA are currently at significant levels. Many of the remaining susceptible stands throughout the Okanagan TSA presently have low levels of infestation or are threatened by adjacent infestations.

The Okanagan TSA has a diverse landscape in terms of elevation and species mix, which will provide more options when developing management plans for mountain pine beetle. Thus, the Okanagan Shuswap Forest District's objectives in responding to this infestation include:

- Directing harvest of AAC and potential uplift volumes to high-priority mountain pine beetle infested stands.
- Conserving the long-term forest values identified in land-use plans.
- Recognizing landscape and stand-level biodiversity strategies and employing harvest methods that will maintain or enhance biodiversity values.

- Extending the time period for economical removal of susceptible mature lodgepole pine to minimize future potential timber supply shortages.
- Reducing the threat to immature lodgepole pine stands (30 to 80 years old), which will contribute to the future harvestable stands of the TSA.
- Enhancing First Nations opportunities in conjunction with accommodation agreements.
- Developing new tenure opportunities to harvest mountain pine beetle stands.
- Recovering the greatest value from beetle-infested timber before it deteriorates, burns or decays, while respecting other forest values.
- Providing for streamlined processing of salvage applications that is consistent with the urgency to take action as described in the goals, objectives and guidelines.

The district proposes to secure funding for annual detailed overview flights to closely track beetle activity and direct harvesting. Consideration will be given to further develop strategies to increase the salvage of dead wood in the TSA.

Projections of the beetle infestation to 2010, 2015 and associated timber supply forecasts

From 2003 to 2004 the area affected by beetles in the Okanagan TSA increased from about 10,500 hectares to about 44,000 hectares. As shown in Figure 1, the majority of the 44,000 hectares affected by beetles in 2004 are in stands with less then 30% mortality.

It is expected however that these stands, if not harvested, will suffer continued mortality losses over subsequent beetles flights and that these same stands will be very severely (> 50% attacked and killed) by 2010. Other susceptible stands, newly attacked between now and 2010, are likely the more moderately impacted stands shown in Figure 1. Our projections indicate that by 2010 about 200,000 hectares, containing approximately 50 million cubic metres of timber, will have experienced varying levels of beetle attack. As shown in Figure 1, this volume is comprised of stands suffering varying levels of attack. Of this 50 million cubic metres volume, we expect that about 21 million cubic metres will be dead if we do not do any pine harvesting between now and 2010.

A number of timber supply forecasts were run to explore how much of the mortality expected to occur by 2010 could be salvaged and to examine the implications of projected beetle losses in the mid term. The following key assumptions applied in all of the following forecasts:

- The inventory files for the Okanagan TSA were updated to reflect recent harvesting to 2004. Projections of beetle mortality were then overlaid on the timber supply analysis data to locate susceptible pine stands projected to be attacked by 2010 and 2015 within the timber harvesting land base.
- Stand- and landscape-level retention was increased to 20% in very severely impacted (> 50% mortality) pine stands. This level of retention is 6% above that assumed in the base case and is a function of the high levels of disturbance expected in these very severely impacted stands in the short term.
- All forest cover requirements that were assumed in the base case are applied in the beetle forecasts with the exception of maximum disturbance constraints applied to the integrated resource and visual zones.
- Within the integrated resource management zone, the maximum percentage disturbance constraint (e.g., maximum 25% of stands permitted below three metres in height) was removed during the uplift period to allow additional harvesting of these stands. The visual disturbance allowances were also increased where very severely impacted pine stands were located in visual retention areas to allow additional harvesting of these stands.
- It is assumed that 73% of the harvest profile in the TSA can be directed at pine with the remaining 27% of harvesting occurring in other species.

- Harvest priority within pine-leading stands was to harvest stands with very severe levels of attack by 2010 (or 2015) in the first five years of the forecast period, and stands with lower-attack levels thereafter. Stands experiencing < 50% mortality are not targeted for harvest before 2010 as they are assumed to remain harvestable indefinitely despite volume loses.
- Shelf life of beetle-killed trees was assumed to be five years for sawlogs with the mortality assumed to occur in 2010 (or 2015).
- For very severely impacted stands that could not be harvested due to forest cover constraints, prior to the end of the shelf life, the regeneration delay on average was 15 years from the time of attack and these stands were assumed to regenerate on natural stand yield curves.

Figure 7 below shows a possible harvest projection if harvesting is concentrated on the stands projected to be very severely (greater than 50% killed) attacked by 2010. This graph shows that a harvest level of 3.224 million cubic metres per year (7% above the base case, 21% greater than the current AAC) for the first five years is required to deal with those very severely attacked stands.

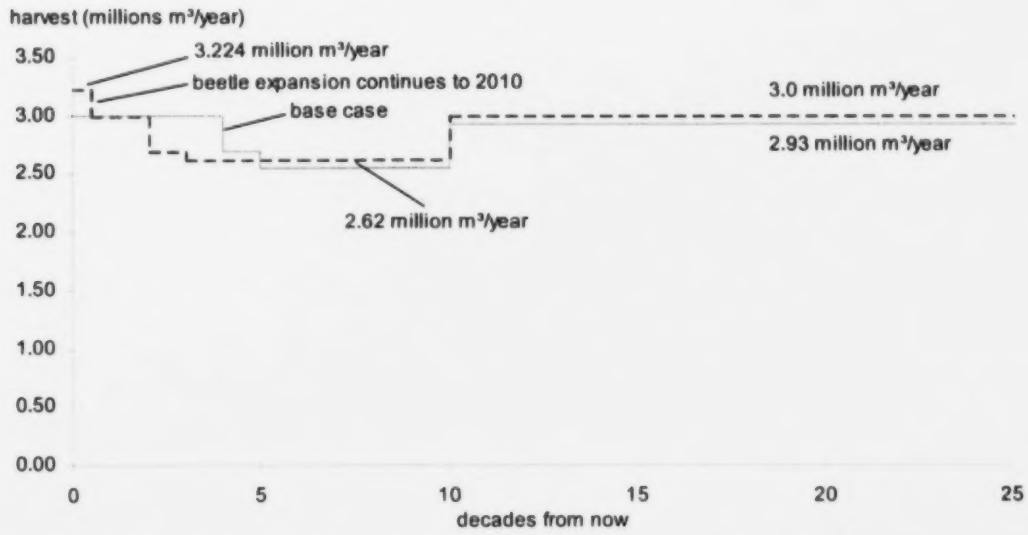


Figure 7. Timber supply forecast if beetle outbreak continues to 2010 — Okanagan TSA, 2005.

If it is assumed the mountain pine beetle epidemic stops in 2010 and the shelf life expires five years later (2015), it is estimated that there will be about 8.8 million cubic metres of dead pine volume, mostly in stands with lower levels of attack that would not have been harvested, i.e., a non-recoverable loss. There was also some non-recoverable loss in the very severely attacked stands because a greater amount of live and dead stands was intentionally retained to provide some structure to offset the increased harvesting or to meet other forest cover objectives.

If the mountain pine beetle epidemic continues to 2015, Figure 1 shows that stands containing slightly more that 50 million cubic metres will be affected. However, the amount of stands in the very severe category will be more than double what it was in 2010. In this situation, it is expected that about 37 million cubic metres will be dead if there is no harvesting in pine stands. Figure 8 below shows a possible harvest projection if harvesting is concentrated on the stands projected to be very severely attacked by 2015. This graph shows that a harvest level of 3.685 million cubic metres per year (23% above the base case, 38% greater than the current AAC) for the first 10 years is required to deal with those very severely attacked stands.

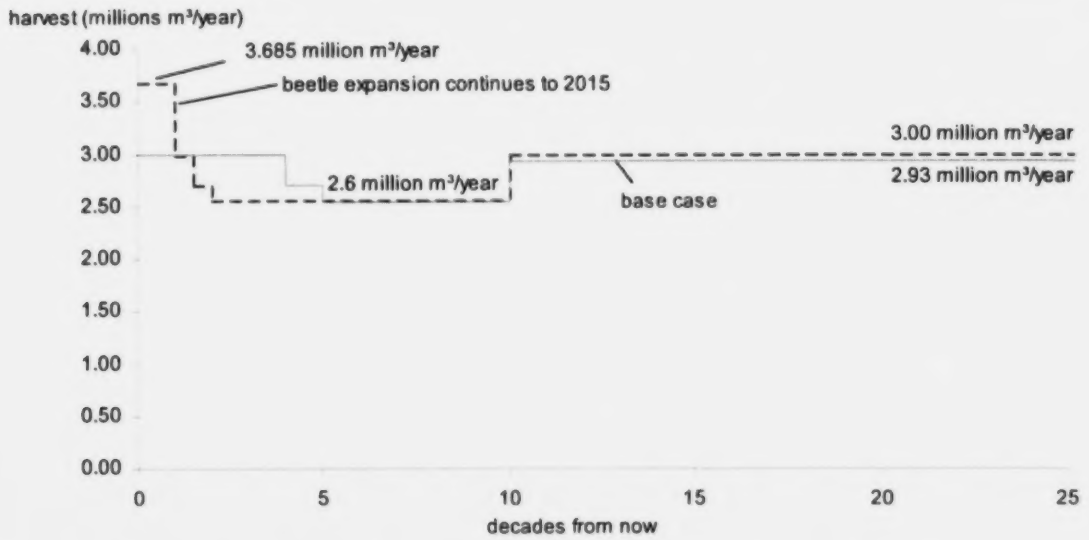


Figure 8. Timber supply forecast if beetle outbreak continues to 2015 — Okanagan TSA, 2005.

If the mountain pine beetle epidemic stops in 2015 and the shelf life expires five years later, (2020) it is estimated that there will be about 8.5 million cubic metres of non-recoverable losses in stands with lower levels of attack that were not harvested. As in the previous scenario, there were some losses in the very severely attacked stands retained to meet legacy requirements for landscape structure or to meet other forest cover objectives.

The above two scenarios assumed that areas required to meet old-growth requirements were non-spatial, i.e., allowing reserves to be moved around and freeing up more severely impacted areas for harvesting. As part of the district's old-growth management strategy, draft old-growth management areas (OGMAs) have been identified. Figure 9 below assumes the same 2010 beetle scenario depicted above and further assumes that the draft OGMAs will not be harvested. This graph shows that a harvest level of 3.068 million cubic metres per year (2% above the base case, 16% greater than the current AAC) for the first five years is attainable as compared to a harvest level of 3.224 million cubic metres per year shown earlier.

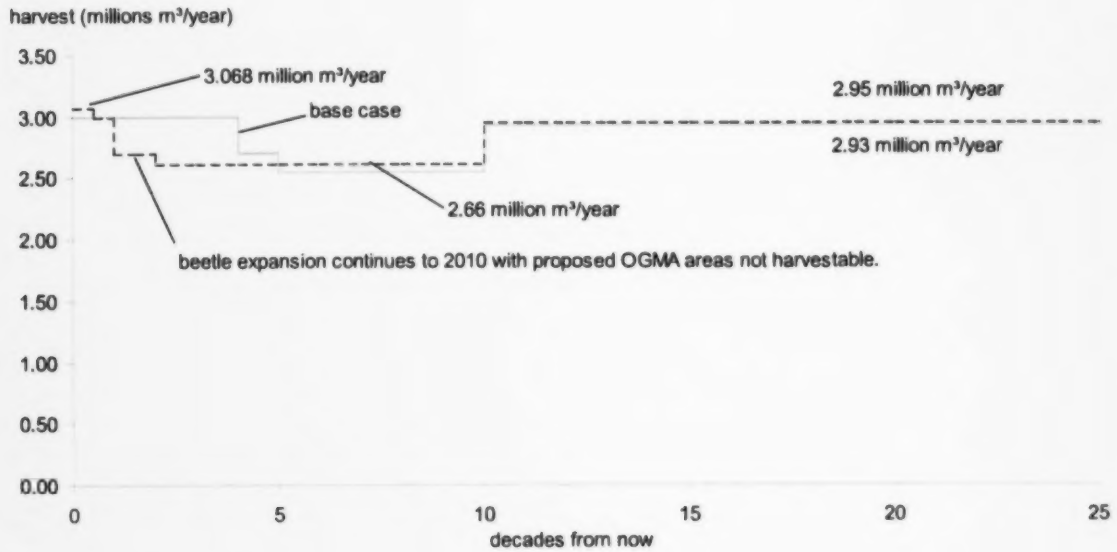


Figure 9. Timber supply forecast if beetle outbreak continues to 2010 and draft old-growth management areas are eliminated from the land base — Okanagan TSA, 2005.

Under these assumptions it is estimated that there will be about 9.8 million cubic metres of non-recoverable losses as compared with 8.8 million cubic metres if the OGMAs were not in fixed locations.

Implications of changes in the AAC

Environmental implications

The recent increase in the mountain pine beetle population in the Okanagan TSA will inevitably affect the structure of the forests. The Okanagan Shuswap Forest District is revising forest management strategies where necessary to mitigate the impact on the environment and the functioning of area watersheds.

To offset environmental implications, the forest district will develop management strategies to consider, among other things, values related to First Nations, watersheds, old-growth management areas, visual quality objectives, harvesting priorities, non-susceptible species retention and wildlife trees.

Regardless of the AAC determined by the chief forester, the district will monitor the beetle epidemic, effectiveness of management strategies, and licensee responsiveness to the epidemic. The findings will be reported annually to the chief forester.

First Nations implications

Eleven First Nations bands reside in the Okanagan TSA, with a total population of approximate 7,300. Four bands (Adams Lake, Neskonlith, Little Shuswap and Spallumcheen) belong to the Shuswap Nation Tribal Council. Seven bands (Lower Similkameen, Upper Similkameen, Osoyoos, Penticton, Westbank, Okanagan and Upper Nicola) are affiliated with the Okanagan Nation Alliance. The Upper Nicola Band is considered part of the Okanagan Nation Alliance as well as the Nicola Tribal Association.

First Nations in the Okanagan TSA are quite involved in forestry, and have expressed interest in being involved in a full range of forestry activities including silviculture, harvesting, watershed restoration and technical work. The Adams Lake, Neskonlith, Little Shuswap, Spallumcheen, Westbank and Osoyoos Bands have woodlots within the Okangan TSA, and the Upper Similkameen Band has a woodlot in the Merritt TSA. Also the Westbank Band has a pilot community forest agreement within the TSA.

The Ministry of Forests and Range intends to fulfill its legal obligation to consult with First Nations in conjunction with the release of this public discussion paper.

Community implications

The implication of changes in the AAC for local communities is an important consideration in the Timber Supply Review. The base case and the beetle harvest forecasts for the Okanagan TSA suggests an increase in short-term harvest. There would be an increase in employment and other industry-related changes in the Okanagan TSA forestry sector if the suggested increases were fully harvested.

Your input is needed

Public input is a vital part of establishing the allowable annual cut. Feedback is welcomed on any aspect of this discussion paper or any other issues related to the urgent timber supply review for the Okanagan TSA. Ministry staff would be pleased to answer questions to help you prepare your response. Please send your comments to the forest district manager at the address below.

Your comments will be accepted until Tuesday, September 6, 2005.

You may identify yourself on the response if you wish. If you do, you are reminded that responses will be subject to the *Freedom of Information and Protection of Privacy Act* and may be made public. If the responses are made public, personal identifiers will be removed before the responses are released.

For more information contact and/or mail your comments to:

District Manager
BC Ministry of Forests and Range
Okanagan Shuswap Forest District
2501 – 14th Avenue
Vernon, BC V1T 8Z1

Phone: (250) 558-1700
Fax: (250) 549-5485

Or electronically mail to
Ted.McRae@gems7.gov.bc.ca

Visit our website at
http://www.for.gov.bc.ca/hts

Background information regarding TSR

The Chief Forester's responsibility

Determining the allowable annual cuts (AACs) for public forest lands in British Columbia is the responsibility of the province's chief forester. In this lengthy and complex process, the chief forester considers technical reports, analyses and public input, as well as government's social and economic objectives.

This responsibility is required by legislation in the *Forest Act*, Section 8. It states that the chief forester shall specifically consider the following factors:

1. The rate of timber production that may be sustained from the area, taking into account:
   - the composition of the forest and its expected rate of growth
   - the time that it will take the forest to become re-established
   - silviculture treatments, including reforestation
   - standards of timber utilization
   - constraints on the amount of timber that may be produced due to use of the forest for other purposes.
2. The short- and long-term implications to the province of alternative rates of timber harvesting from the area.
3. The economic and social objectives of the Crown for the area, region and province — as expressed by the minister of forests.
4. Abnormal insect or disease infestations, and major salvage programs planned for the timber on the area.

Some of these factors can be measured and analyzed—others cannot. Ultimately, the chief forester's determination is an independent professional judgment based on the best available information. By law, the chief forester is independent of the political process, and is not directed by the minister of forests and range when determining AACs. In these determinations, the chief forester considers relevant information from all sources.